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twelve to ninety hours after feeding with proteids. The secretion is poured into the intestine, where it acts by means of its ferments on the three classes of foods : proteids, carbohydrates and fats.

Mr. Murlin is unanimously recommended by Group Committee XV. as a candidate for the degree of Doctor of Philosophy.

*Professor Crawley, Presentor.*

Roxana Hayward Vivian was born at Hyde Park, Mass., December 9, 1871. She received her early education in the public schools of Hyde Park, graduating from the High School in 1890. She entered the freshman class of Wellesley College the same year, receiving the degree of Bachelor of Arts in 1894. From 1895 to 1898 she taught Greek and mathematics in a preparatory school, and from 1896 to 1898 pursued graduate work in the same subjects at Wellesley college. She entered the Department of Philosophy of this University October 10, 1898, as *alumnæ* fellow in mathematics. This appointment carried with it candidacy for the degree of Doctor of Philosophy. She was twice reappointed to her fellowship, holding it for three successive years. She elected her major and one minor in mathematics, and the other minor in astronomy. She has completed thirty standard courses, and has satisfactorily passed written examinations in astronomy with Professor Doolittle and Mr. Eric Doolittle, February 14, 1901 ; in mathematics with Professor Crawley, Assistant Professors Fisher and Schwatt and Dr. Hallett, on April 4 and 13, and May 11, 1901. She has presented a thesis entitled 'The Poles of a Right Line with Respect to a Curve of Order  $n$ .' The thesis will be printed at once. Pending its appearance Miss Vivian has deposited with the Dean a copy of the manuscript and the money necessary to print it. The scope of the thesis may briefly be outlined as follows :

The general subject of poles and polars with respect to Higher Plane Curves has been studied by numerous mathematicians, notably by Steiner, Cremona and Clebsch. Steiner gave in *Crelle's Journal*, Vol. XLVII., a large number of theorems relating to this subject, but he omitted the proofs. They were all proved subsequently by Cremona. Cremona's method was peculiar to himself, that is, he adapted a somewhat more general theory, that of the loci of harmonic means, to the theory of poles and polars. In discussing these problems Miss Vivian uses the analytic method. The particular line of discussion which she has taken up is one which has not been treated in any detail by any former writer. She has handled the subject ably, and has arrived at some very interesting results. In one or two instances her results show that the statements of former writers must be

taken with certain limitations, which do not appear to have been considered. Her principal object is to establish the ways in which the poles of a line are limited when the line has certain prescribed relations to the fundamental curve of the  $n$ th order, and to its allied curves, the Hessian and Steinerian. Under particular conditions certain points in the plane will be poles for all lines in the plane, while the other poles, called by the candidate 'free poles,' vary with the line. Many writers do not class the first as poles at all, but it seems more reasonable to class them with the other poles, since they have all the required properties of such points ; and, besides, it is more in keeping with the present tendency of thought on these subjects to do so. The subdivisions of the paper are as follows :

1. The pencil of curves of which the poles are base points.
2. The related curves.
3. Poles when the curve  $u-o$  has no singularities.
4. The inflection locus.
5. Poles when the curve  $u-o$  has double points and cusps.
6. Intersections of higher order with the Steinerian.
7.  $u-o$  with triple points and higher multiple points.

Miss Vivian is unanimously recommended to the Faculty of Philosophy by Group Committee XI. for the degree of Doctor of Philosophy.

*SCIENTIFIC NOTES AND NEWS.*

WE publish in this issue of *SCIENCE* the admirable presidential address given before the American Association, at Denver, on Tuesday, by Professor Woodward, and the vice-presidential address given by Professor Davenport before the Zoological Section, which is also a model of what such an address should be. We hope to publish next week an account of the meeting and one or two further addresses by the vice-presidents.

PROFESSOR THEODORE WM. RICHARDS, of Harvard University, has been invited to fill the newly established professorship of inorganic chemistry in the University at Göttingen. The position is entirely free from routine teaching, being confined to research work with the assistance of such advanced students as may be selected. It will be remembered that Professor J. H. van't Hoff was called from Holland to fill a similar position at the University of Berlin. The fact that Germany should invite two for-

eigners to such important positions demonstrates the broad-mindedness and freedom from prejudice which in part accounts for the high positions that its universities maintain. The creation of chairs devoted to research is also a forward movement in Germany, which it will be necessary for this country to follow. It is certainly a great compliment to the United States that Germany should seek here a professor for such a chair, more especially when we remember the very great number of chemists that are being trained in Germany. We are glad to learn that the president and fellows of Harvard College have taken action leading Professor Richards to remain in this country.

THE Veitch silver medal has been awarded to Mr. Thomas Meehan, of Philadelphia, 'for distinguished services in botany and horticulture.' Mr. Meehan is the third American on whom this medal has been conferred, the others being Professor Charles S. Sargent, of the Arnold Arboretum, and Professor Liberty H. Bailey, of Cornell University.

PRESIDENT LOUBET of France has conferred upon President W. R. Harper, of the University of Chicago, the decoration of the Legion of Honor.

MR. MARSHALL H. SAVILLE had been named Officier d'Académie by the French Government in recognition of his archeological researches in Mexico for the American Museum.

ON the recommendation of the Council of the Royal College of Physicians, England, it has been unanimously resolved "that the Baly Medal be awarded to Frederick William Pavy, M.D., F.R.S., F.R.C.P., for his researches on 'The Physiology of the Carbohydrates; their Application as Food, and Relation to Diabetes,' 1894; but more especially for his original investigations on sugar formation in the liver, which he has carried on during the last forty years, and with unabated enthusiasm during the last two years."

DR. VINCENT CZERNY, the eminent professor of surgery at the University at Heidelberg, is on his way to the United States, in order to visit our medical schools.

WE noted recently that a monument to Chevreul had been unveiled in the Court of the

Museum of Natural History, Paris. We learn from French exchanges that addresses were made on the occasion by M. Edmond Perrier, director of the Museum, by M. Armand Gautier, representing the Academy of Sciences and the Academy of Medicine, by M. Arnaud, who in 1890 succeeded Chevreul in the chair of organic chemistry at the Museum, by M. David, director of the chemical laboratory of the Gobelins' Manufactory, and by M. Puglier-Conti, vice-president of the Paris municipal council. The marble statue is by M. Fagel, and is erected on a pedestal bearing the inscription:

### CHEVREUL

MICHEL-EUGÈNE

NÉ A ANGERS LE 31 AOUT 1786

MORT A PARIS LE 7 AVRIL 1889

PROFESSEUR DE CHIMIE ORGANIQUE

1830-1889

DIRECTEUR DU MUSÉUM D'HISTOIRE NATURELLE

1863-1884

It is proposed to erect a statue of Pasteur at Marnes, near Saint Cloud, where Pasteur spent the last years of his life. M. Duparquet, mayor of Marnes, is chairman of the executive committee.

DR. HENRY BENNER, professor of mathematics at Albion College, was drowned on August 14, in Lake Orion.

The death is announced of Dr. Domenico Stefanini, professor of bacteriology at the University of Pavia, at the age of eighty years; and of General Venukoff, a Russian geographer and geodesist living at Paris, at the age of seventy-one years.

THE Vienna Academy of Sciences announces that the prize founded by Freiherr von Baumgartner, will be awarded at the end of 1903 for a research enlarging our knowledge of the invisible radiations. The value of the prize is 2,000 crowns.

AT the meeting of the International Congress of Botanists which opened at Geneva, on August 7, it was voted to establish a Société Internationale de Botanique, and a series of laws was formulated which will be sent in print to botanists interested. It was decided to purchase the *Botanisches Centralblatt*, includ-

ing all back numbers, index and *Beihefte*, of the present publishers, Gebrueder Gotthelft, of Cassel. The journal is to be registered and a limited company formed in Holland. Shares will be sold to cover the purchase. Beginning with January, 1902, it will be published by E. J. Brill, of Leyden, with Dr. Uhlworm as editor and Dr. Kohl as assistant. Annual subscribers are to have equal rights with the stockholders in conducting the business. The Société elected Professor Karl Goebel of Munich, president, Professor F. O. Bower, of Glasgow, vice-president and Dr. J. P. Lotsy, Tjébodas, Java, secretary. The next meeting is to be held in Vienna, three years hence. Switzerland and France were most largely represented among the delegates present. The United States were represented by Professor J. C. Arthur, Dr. D. S. Johnson, Dr. F. E. Lloyd, Mr. W. Murrill and Dr. H. von Schrenk as delegates. The delegates were very hospitably received in Geneva, and a banquet was given in their honor. After the meeting some of the delegates, under the direction of Professor Chodat, of Geneva, made an excursion among the Swiss Alps.

ACCORDING to a cablegram to the daily papers the most important question of the meeting of the Zoological Congress came up on August 14, in the Committee on Nomenclature. Two propositions were presented. The French delegation proposed to make the existing nomenclature conform with the classic Latin, grammatically and etymologically. The American delegates proposed to make no changes, except in the case of obvious typographical errors. The Germans made a compromise proposition, which did not find favor. After a warm discussion the French proposition was accepted, the Swiss delegates giving the deciding vote for the proposal. The Dutch delegates and part of the German delegation voted with the Americans. The British delegates voted with France.

THE French Surgical Congress will hold its fourteenth annual meeting in Paris on October 21 and following days.

WE learn from the *British Medical Journal* that an Egyptian Medical Congress is to be held under the patronage of the Khedive at

Cairo from December 10 to 14, 1902, under the presidency of Dr. Abbate Pacha. The honorary presidents are Dr. Ibrahim Pacha Hassan, Dr. Pinching, and Dr. Ruffer. The general secretary is Dr. Voronoff. The work of the Congress will be divided among three sections, as follows: (1) Medical Sciences, presided over by Dr. Comanos Pacha; (2) Surgical Sciences, presided over by Dr. H. Milton; and (3) Ophthalmology, presided over by Dr. Mohammed Bey Eloui. The program of the Congress will include discussions on affections especially rife in Egypt, such as bilharzia, ankylostomiasis, bilious fever, abscess of the liver, etc. Special attention will be given to questions relative to the epidemics which for some years past have regularly visited Egypt, and the prophylactic measures to be taken against them. The following papers among others have been promised: 'Alcoholism and its Increase in Egypt,' by Dr. de Becker; 'The Frequency of Hydrocele in Egypt and its Treatment,' by Dr. Colloridi; 'Myxœdema in Egypt,' by Dr. Brossard; 'Plague,' by Dr. Gotschlich; and 'Tuberculosis in Egypt,' by Drs. Ibrahim Pacha Hassan, Eïd. and Sandwith.

THE twelfth annual general meeting of the Institution of Mining Engineers will be held at Glasgow on September 3-6, under the presidency of Sir W. T. Lewis, Bart.

FOLLOWING the Congress on Petroleum, held in Paris in 1900, a second congress will be held in Paris in 1902. A permanent committee has been formed in Paris under the presidency of M. Ed. Lippmann, the secretary of the congress, and M. Dvorkovitz has recently established in London an institute for the scientific study of petroleum.

A MEETING of the Board of Visitors of the National Bureau of Standards was called in Washington, for August 23d, for the purpose of passing on proposed sites for the laboratory of the bureau. It will be remembered that the five members of the Board of Visitors were appointed by Secretary Gage, and are as follows: Dr. H. S. Pritchett, president of the Massachusetts School of Technology; Dr. Ira Remsen, president of the Johns Hopkins University; Dr.

Elihu Thomson ; Professor Edward L. Nichols, of Cornell University, and Albert L. Colby, of Pennsylvania.

ACCORDING to *Nature* the Paris correspondent of the *Chemist and Druggist* states that with a view to giving an impetus to the study of applied chemistry in Paris, it has been decided to build additional laboratories at the Conservatoire des Arts et Métiers. The initial expense is estimated at 500,000f. (20,000*l.*), and the annual upkeep at something over 3,000*l.* The laboratories will also be used for experiments in physics and mechanics.

THE German Government has sent an expedition to German East Africa for the purpose of organizing a systematic effort for the prevention of malaria. The expedition is under the command of Dr. Ollwig, Staff-Surgeon *à la suite* serving with the Imperial forces in East Africa.

A NORTH German Lloyd steamer has been chartered to leave Sydney, N. S. W., on October 11 for Kerguelen Land, conveying provisions and dogs for the German Antarctic expedition on board the steamer *Gauss*.

THE book on 'Mosquitoes' by Dr. L. O. Howard, recently reviewed in this journal by Professor Packard, is being translated into Spanish.

THE Station of the U. S. Fish Commission on the Great Lakes, with headquarters at present at Put-in-Bay, Ohio, is collecting the literature of fresh-water fauna and flora, and Professor H. S. Jennings, who has charge of the Station, will be glad to receive from authors and others publications in these subjects.

M. MAREY, the president of the International Committee on Physiological Instruments, will be glad to have sent to him at Boulevard Delessert, No. II., Paris, new physiological apparatus for presentation at the International Congress of Physiology to be held at Turin next month.

FOR the last week for which the report is at hand, the deaths from the plague in India numbered 1,125. At the same period last year there were only 200 deaths.

WE learn from *Nature* that the annual awards of prizes by the Reale Accademia dei Lincei, of Rome, are as follows : The Royal prize for chemistry has been adjudged to the late Pro-

fessor Amerigo Andreocci for his researches on heterocyclic compounds and on the santonine group, and other papers. The Royal prize for philosophy and moral science has been adjudged to the late Professor Carlo Giussani. In political science and jurisprudence no award has been made, and the same is true of the Santoro prize relating to agricultural zoology. The two prizes instituted by the Minister of Public Instruction in favor of teachers in secondary schools for work in natural science have been divided, awards being given to Professors Liberto Fantappiè (Viterbo), Antonio Neviani (Rome), De Toni (Venice), and Giacomo Trabucco (Florence). Two 'Ministerial' prizes of a similar character for philosophical and social sciences are awarded to Professors Luigi Einaudi (Turin) and Aurelio Covotti (Palermo).

THE annual meeting of the Fellows of the Royal Botanic Society, according to the report in the London *Times*, was held on August 10, in the museum in the society's gardens at Regent's Park. Mr. C. Brinsley Marlay presided. The Duke of Teck was elected president, Mr. G. J. Marjoribanks treasurer, and the Marquis of Breadalbane, Earl Howe, the Earl of Aberdeen, Sir Henry Oakley, Sir J. Blundell Maple, M.P., Mr. J. Fletcher, Dr. R. C. A. Prior and Mr. W. Sowerby were re-elected members of the council. The 62d annual report stated that the negotiations with the Department of Woods and Forests had been concluded and a new lease of the gardens had been granted for 31 years. The accounts showed that the year's working had resulted in a profit of £285, being nearly double that of the previous year. The number of fellows on the books was 2,124, which showed a steady increase in number, 88 new fellows having joined the society during the year. The garden's club continued to form one of the attractions of the society, 41 fellows of the society having joined the club during the year ; and the past season had been a very successful one. The chairman, in moving the adoption of the report, said that the prospects of the society were decidedly better than they had been for some years past. Their lease had been renewed and a large number of their debentures—viz., £5,700—had been taken up. The so-

ciety was in a transition state. Mr. Austen Chamberlain, as representing the Treasury, had insisted that the society should open its gates to the public a certain number of days in the year; in fact the public had rights there which had to be recognized. Therefore the old character of the gardens had almost completely disappeared. The Society still retained its scientific character, however, and whatever facilities they could give to promote science, particularly botany, they would give. They had been unable to obtain a grant from the Government, and the scientific part of the gardens was, therefore, carried on with great difficulty. The subscriptions of the fellows were not sufficient to keep up the gardens as they should be kept up, and the council had to rely, therefore, in some measure upon the entertainments. Towards the end of the meeting the chairman called attention to the skill and beauty of a large number of Japanese drawings of flowers and birds, of which he had a very fine collection.

At the last meeting of the Berlin Medical Society, held on July 25, Professor Virchow is reported by the *Lancet* to have alluded to the recently-enunciated views of Professor Koch as to the non-identity of tuberculosis in cattle with that affecting the human subject. In his sarcastic style he remarked that he was happy to find that Professor Koch's views had undergone a change and were now in accordance with his own, for he had maintained that the mere presence of the Koch bacillus was not the essential thing in tuberculosis; a tubercle was, in his opinion, a growth with a distinct anatomical structure, and he had always protested against the bacteriologists terming anything a tubercle simply because a Koch bacillus happened to be present. He said that the adherents to Koch's theory had believed his view to be rather old-fashioned, but it did not annoy him to recall to mind that he had sometimes been superciliously treated by the younger bacteriologists. Professor Virchow's ironical words produced a great impression on the meeting.

ACCORDING to the *Comptes Rendus*, as translated in the *Scientific American*, H. Becquerel

has confirmed, by an unpleasant experience, the fact first noted by Walkoff and Giesel, that the rays of radium have an energetic and peculiar action on the skin. Having carried in his waistcoat pocket for several periods, equal in all to about six hours, a cardboard box enclosing a small sealed tube containing a few decigrammes of intensely active radiferous barium chloride, in ten days' time a red mark corresponding to this tube was apparent on the skin; inflammation followed, the skin peeled off and left a suppurating sore, which did not heal for a month. A second burn subsequently appeared in a place corresponding to the opposite corner of the pocket where the tube had been carried on another occasion. P. Curie has had the same experience after exposing his arm for a longer period to a less active specimen. The reddening of the skin at first apparent gradually assumed the character of a burn; after desquamation a persistent suppurating sore was left which was not healed fifty-six days after the exposure. In addition to these severe 'burns' the experimenters find that their hands, exposed to the rays in the course of their investigations, have a tendency to desquamate; the tips of the fingers which have held tubes or capsules containing very active radiferous material often become hard and painful; in one case the inflammation lasted for fifteen days and ended by the loss of the skin; and the painful sensation has not yet disappeared, after the lapse of two months.

ACCORDING to a notice in *Nature*, the annual report of the Russian Geographical Society for 1900 notes the growing activity of the young branches of the society at Vladivostok, Kiakhta, Tomsk and Orenburg—their work being not limited to pure geography, but being mainly directed to the exploration of the geology, botany, zoology and prehistoric anthropology of the respective regions. A new local museum has consequently been opened at Troitskosavsk, near Kiakhta, in addition to those of Minusinsk and Yeniseisk. The chief medal of the Geographical Society, the Constantine medal, was awarded this year to V. Obrucheff, the explorer of the Nan-shan and Mongolia, who has also explored very large portions of Transbaikalia and the Pacific littoral, and whose preliminary

reports are always of the deepest interest for both the geologist and the orographer. The Count Lütke medal was awarded to M. E. Zhdanko for his extensive geodetical and hydrographical works in the far North, the Semenov medal to J. A. Kersnovsky for work in meteorology, and the Prjevalski medal to the Tomsk professor, V. V. Sapozhnikoff, whose explorations of the Altai highlands revealed hundreds of unknown glaciers, as well as widely-spread traces of glaciation, and threw much new light on the geography of the whole region. These researches are now embodied in a work, 'The Katuñ and its Sources' (with maps and a summary in French).

THE Society of Chemical Industry held its annual meeting at Glasgow at the end of July. The secretary reported that the society was in the most prosperous condition, there being now 3,632 members. The president, Mr. J. Wilson Swan, chose as the subject of his address 'Electro-chemical Industry.' According to the abstract in the *London Times* he traced the progress of this branch of applied science from the early laboratory researches of Davy and Faraday down to the position it occupied at the present time. He gave particulars of the power at present utilized and products made in the 150 works using electricity for chemical and metallurgical purposes in Europe, and described the methods employed in the several branches of manufacture. In several instances the new methods of manufacture had already supplanted the old, while in others there was keen competition between the chemical and the electrolytic processes. Turning to the future, Mr. Swan pointed out that the united kingdom was severely handicapped as regards these new developments by her lack of water-power. In spite of this, however, many of the new electro-chemical industries could be carried on profitably with steam-power. The utilization of the waste gases of blast furnaces in large gas-engines for the generation of electrical energy would also become a realized fact, and would supply large quantities of cheap power for the industries under discussion. While, therefore, admitting that the position of the staple chemical and allied industries in England had been undermined to some extent by the rapid

growth of electro-chemical industries abroad, and that protective tariffs were being employed to shut out British products, Mr. Swan believed the future might be faced with some degree of confidence and hope. Speaking in one of the lecture theaters of a great university, whose long and splendid services to education has lately been commemorated, he could not but congratulate Scotland and the Scottish section of the society on the very advantageous position it occupied in that respect. In England and Ireland they were suffering acutely from dire educational neglect and destitution. They were giving to the classes at the bottom of the industrial ladder a disjointed smattering of miscellaneous science of no great value, though probably good so far as it went, while they were neglecting to thoroughly educate those upon whose shoulders would soon rest the weight of the management of the great manufacturing industries. A scientific training of university standard for our manufacturers and for our technical chiefs was an absolute necessity. One of the most pressing requirements of the moment, demanded not only in the interest of chemical industry, but in that of the manufacturing industries generally, was the adequate endowment and encouragement of research. The advances in knowledge, and the consequent revolutionary changes that had taken place in almost every branch of chemical industry during the last 100 years were probably not greater than those further changes that would be seen at the end of the present century, for change brought about by scientific discovery grew ever swifter and more sweeping. Change was the natural order of things; but, to take advantage of it, the fullest measure of assistance was demanded that education and energy could give.

MR. W. H. MAW recently delivered his presidential address before the members of the British Institution of Mechanical Engineers. Dealing with the question of the education of young mechanical engineers, he said, according to the *London Times*, that nothing was more disheartening to a student than to find at some stage in his career that he had been devoting time to learning things which were not only useless to him, but which it was desirable he

should unlearn, while, on the other hand, he had failed to acquire knowledge of which he stood badly in need. Yet this was a far too frequent experience with boys entering technical colleges from the public schools. The remedial changes which had so far been made in this direction were limited in extent compared with those really required, and there was still left to be done at the technical college much educational work which ought to have been done at school, the result being a waste of valuable time. The matter was one which merited the most careful attention of all interested in technical education. There came a time when every engineer must specialize if he really wanted to attain anything more than a subordinate position. This specialization should be at least commenced during the college career rather than subsequently, the student devoting the latter part of his course at college to the acquirement of a knowledge of the special principles which underlay practice in the particular branch of the profession to which he was about to devote himself. This meant that the college authorities must take a wider view of their responsibilities than many of them did at present. It would also probably mean in the future that certain colleges would acquire a reputation for certain branches of work. One of the chief aims of technical college training should be to develop independent thought and action in a student. It could not be too thoroughly appreciated that the vast development of mechanical engineering work which had been going on in the past half-century, and which was still going on at an ever-increasing rate, was producing a most important change in the conditions which secured both professional and commercial success. In the old days the leading firms of mechanical engineers had comparatively few customers, and they had, as a rule, to meet the great variety of requirements of those customers to the best of their ability. Repetition work was comparatively rare, and success depended largely on resourcefulness and the power of entering thoroughly into the conditions to be fulfilled. Nowadays the successful mechanical engineer was not he who made a great variety of things for the few, but a small variety of things for the many, at the same time pro-

ducing those few things in the most perfect way. Experience showed clearly that mere lowness of price was not in itself an inducement to purchasers, and the maker of an engine of exceptional economy or of a machine too, which excelled its competitors in the quantity or quality of the work it turned out would never find difficulty in obtaining proportionately good prices for his productions.

#### UNIVERSITY AND EDUCATIONAL NEWS.

BEREA COLLEGE, Ky., receives \$50,000 by the will of Stephen Ballard, of Brooklyn.

THE Department of Agriculture has received a communication from the University of California announcing that a dairy school is to be established at that institution and requesting that a butter and cheese expert of the department be permitted to go to California to assist in establishing the school. Mr. W. E. Griffith, one of the experts of the department, will be assigned to this work August 20.

PRESIDENT JAMES WHITFORD BASHFORD, of Ohio Wesleyan University, has been offered the presidency of Northwestern University.

DR. T. D. WOOD, professor of hygiene and organic training at Stanford University, has accepted a similar position at Teachers College, Columbia University.

ELLIOT R. DOWNING, Ph.D. (Chicago), who has been during the summer assistant in zoology at Chicago University, will in the autumn take charge of the biological department at the Northern State Normal School at Marquette, Mich.

DR. CHARLES F. HOTTES has been appointed instructor in botany in the University of Illinois. Mr. Hottes was formerly assistant in the botanical laboratory of the University, but has spent the last three years at the University at Bonn, studying plant physiology and cytology. Mr. H. Hasselbring, of the New York Agricultural Experiment Station at Geneva, has been appointed assistant in the Agricultural Experiment Station of the same University.

DR. FLORENCE M. LYON, of Smith College, has been appointed associate in botany in the University of Chicago and dean of Beecher Hall.